Remarks

Status of the Claims

Claims 1-3 are in the case. All three have been amended. The Specification has been amended to correct some typographical errors. For example, in the equations cited for the present value calculations found in paragraphs [0003] [0004] [0007] [0008] and [00017], n was erroneously substituted for i and fs for fj.

Rejections Under 35 USC §101

The Action rejects claims 1-3 under §101 for lack of utility, taking the position that the claimed inventions are without practical utility and do not produce a tangible result. Applicants respectfully traverse in that a numerical measure of a private portfolio manager's performance is a useful, tangible, and concrete result.

As described in the Specification, evaluation of a manager's contribution to a public investment portfolio depends in part on the availability of an index as an investible alternative. In other words, a manager's performance can be compared to the return that could have been obtained by investing all the assets in an index fund. Performance can also be measured in part in the public markets by time weighted rate of return, which ignores the timing of interim cash flows. Neither of these is available in the private markets, thus creating a need for a measurement of a private portfolio manager's performance. (Specification pages 2-4)

As shown in the example beginning at paragraph [00024] on page 9, using the claimed systems and processes a numerical value of the manager's performance is obtained. This evaluation is then useful for manager selection as well as improving manager performance in portfolio management. Thus, although an algorithm is used, the present claims are analogous to

allowable claims as discussed by the *Federal Circuit in State Street Bank & Trust Co. v.*

Signature Financial Group, Inc. 47 USPQ 2d, 1596 (Fed. Cir. 1998)

The Supreme Court has identified three categories of subject matter that are unpatentable, namely "laws of nature, natural phenomena, and abstract ideas." *Diehr* , 450 U.S. at 185. Of particular relevance to this case, the Court has held that mathematical algorithms are not patentable subject matter to the extent that they are merely abstract ideas. See *Diehr*, 450 U.S. 175 [209 USPQ 1], passim; *Parker v. Flook*, 437 U.S. 584 [198 USPQ 193] (1978); *Gottschalk v. Benson*, 409 U.S. 63 [175 USPQ 548] (1972). In *Diehr*, the Court explained that certain types of mathematical subject matter, standing alone, represent nothing more than abstract ideas until reduced to some type of practical application, i.e., "a useful, concrete and tangible result." *Alappat*, 33 F.3d at 1544, 31 USPQ2d at 1557.

Unpatentable mathematical algorithms are identifiable by showing they are merely abstract ideas constituting disembodied concepts or truths that are not "useful." From a practical standpoint, this means that to be patentable an algorithm must be applied in a "useful" way. In *Alappat*, we held that data, transformed by a machine through a series of mathematical calculations to produce a smooth waveform display on a rasterizer monitor, constituted a practical application of an abstract idea (a mathematical algorithm, formula, or calculation), because it produced "a useful, concrete and tangible result"--the smooth waveform.

Similarly, in *Arrythmia Research Technology Inc. v. Corazonix Corp.*, 958 F.2d 1053, 22 USPQ2d 1033 (Fed. Cir. 1992), we held that the transformation of electrocardiograph signals from a patient's heartbeat by a machine through a series of mathematical calculations constituted a practical application of an abstract idea (a mathematical algorithm, formula, or calculation), because it corresponded to a useful, concrete or tangible thing -- the condition of a patient's heart.

Today, we hold that the transformation of data, representing discrete dollar amounts, by a machine through a series of mathematical calculations into a final share price, constitutes a practical application of a mathematical algorithm, formula, or calculation, because it produces "a useful, concrete and tangible result"--a final share price momentarily fixed for recording and reporting purposes and even accepted and relied upon by regulatory authorities and in subsequent trades. *State Street* 1600, 1601

The present inventions thus produce a useful, tangible result that is a numerical or quantitative measure of a manager's performance and that is produced by data, transformed by a machine through a series of mathematical calculations to produce a useful, concrete, tangible result that is used in making investment and employment decisions. The subject mater of the claims is thus statutory subject matter according to the Supreme Court and Federal Circuit decisions cited above. Applicants respectfully request, therefore, withdrawal of the rejections under §101.

Rejections Under 35 USC §112, 1st Paragraph

Claims 1-3 are also rejected under 112, first paragraph for failing to comply with the enablement requirement, primarily on the ground that the Specification is directed to determination of Internal Rate of Return IRR, rather than the more generic "return" as cited in the claims.

The claims are amended to further clarify that the term "return" is meant to indicate internal rate of return. Applicants request therefore that this rejection be withdrawn.

The Action further states that the Specification does not provide one of ordinary skill in the art with a method of determining an IRR, nor to determine a common start date that is an earliest start date in the portfolio. Applicants respectfully traverse in that the Specification fully enables one of skill in the art to practice the claimed inventions.

Applicants submit that one of skill in the art would be enabled to determine an IRR based on the disclosure in the Specification. For example, both paragraphs [0003] and [0007] cite formulas for determining IRR. One of skill in the art would realize, however, that IRR cannot be solved directly – it must be solved iteratively using numerical methods routinely incorporated into spreadsheet and/or database software modules or functions. One of the most common library

routines for solving for IRR is the XIRR function found in the various versions of Microsoft Excel. One of ordinary skill would thus understand how to apply and use the cited formulas to determine an IRR.

Furthermore, the term "a common start date that is the earliest start date in the portfolio" is fully enabled by the specification. The Examiner's attention is drawn to the specification:

> [0008] An alternative method of IRR computation is referred to in the industry as the time-zero method. In the time-zero IRR method, all investments are presumed to begin at the same date (the zero date).

Applicant submits that one of skill would understand the phrase "presumed to begin at the same date" to have the same meaning as a "common date" as used in the claims. The term "earliest date in the portfolio" is plain language that means the date of the first investment in the portfolio. This claim language is thus fully enabled in the Specification and would be understood by one of skill.

Regarding use of the term "algebraically," Applicants point to paragraph [0029] which defines the term as the addition of numbers with positive and negative signs.

Applicants assert that the Examiner has not met his burden of establishing a reasonable basis for any of these enablement rejections.

> it is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain why it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement. Otherwise, there would be no need for the applicant to go to the trouble and expense of supporting his presumptively accurate disclosure. *In re Marzocchi*, 439 F.2d 220, 224, 169 USPQ 367, 370

Based on the previous discussion and amendments, Applicants respectfully assert that the claims are fully enabled and request the withdrawal of the rejections under 112, 1st.

Rejections Under 35 USC §112, 2nd Paragraph

The Action rejects claims 1-3 as indefinite. The first rejection is of the terms "'determining a return' by 'scaling a portfolio to a neutral weight portfolio.'" The comments or reasoning in the Action are not directed to the cited claim terms, but rather to the formula found in [00017] on page 6. Because what Applicant regards as his invention is clearly stated, and the Action's argument is that this objective is not supported in the Specification, Applicants will consider this to be another enablement rejection and not a rejection of the claim terms, which are not indefinite and convey their ordinary meanings.

The method of determining a return (an internal rate of return) by scaling to a neutral portfolio is described in the table titled Pro Forma Scaled to Arbitrary. The use of the formulas cited in the Specification are well known in the art, and one of skill understands, regarding IRR=r, in the formula in paragraph [0003] that the amount of the cash flow invested into the investment at each date i periods after the inception date (also termed the zero date) of the investment is denoted $CF_i < 0$, the amount of the cash flow distributed by the investment at each date i periods after the inception date (also termed the zero date) is denoted $CF_i > 0$ and the total number of periods to the last cash flow is denoted n:

It is important to note that the discount rate r required to make $\sum_{i=0}^{n} \frac{CF_i}{(1+r)^i} = 0$ must be determined iteratively using numerical methods routinely incorporated into commercially available spreadsheet and/or database software modules or functions. One of the most common library routines for solving for IRR is the XIRR function found in the various versions of

Microsoft Excel. XIRR and equivalent functions incorporated into commercially available software automatically calculate the number of periods between the various dates at which the associated cash flows occurred in calculating the discount rate r such that $\sum_{i=0}^{n} \frac{CF_i}{(1+r)^i} = 0$." In order to obtain the annualized IRR used by those skilled in the art, periods are denominated in years and/or fractions thereof. The use of such iterative programs is well known in the art, and a skilled artisan, upon reading the specification would understand as much.

The relationship between IRR_k and the formula is already stated as succinctly as possible in [00017]:

$$IRR_k = r_{pf} \text{ where } \sum_{i=0}^{n} \frac{\sum_{j=1}^{m} f_j CF_{i-i_0,j}}{(1+r_{pf})^{i-i_0}} = 0 \text{ (remember that, just as in [0003], [0004], [0007], [0008]}$$

and [00017], r_{pf} must be found iteratively) and $f_j = \dfrac{k}{\sum\limits_{i=0}^{n} NCF_{i,j}}$.

In the last equation, $k \neq 0$ is any arbitrarily chosen constant. The Action's statement that the scaling factor f_j (in the original, f_s) is a constant is erroneous; there is no statement to that effect in the patent disclosure. The scaling factor f_j is constant for all i of the same j, but of course the denominator, and thus the scaling factor, changes for each j. The definitions for i and j are contained in both [0003] as corrected and in [00017] as filed. The claims are thus fully enabled and Applicants request that this rejection be withdrawn.

The Examiner's objection to "portfolio index" has been addressed in the amendments to the claims. The definition of portfolio index is shown in the table on page 10, paragraph [00024].

Rejections Under 35 USC §103

The Action rejects claims 1-3 as obvious over Feldman US Patent No 6,640,204 in part because Feldman is said to teach that a manager's performance is determined by comparison to an index. Applicants respectfully traverse in that the Feldman disclosure is comparing a manager's performance in managing publicly traded securities to a public sector index. The present claims, in contrast, are directed to obtaining a measure of manager performance without reliance on such an index, which is not available for private markets. Rather, the portfolio index in the present claims is based on IRR calculations as described in the specification.

Furthermore, Feldman's patent cannot suggest the claimed invention because it describes the use of cooperative game theory to resolve statistical joint effects problems. The method taught in the instant application does not use cooperative game theory. Further, both the portfolio performance attribution exemplar in the Feldman patent and the Prudential Real Estate Investors paper also cited as prior art use the same performance attribution method incorporated into the Prior Art portion of the instant application, a method that is effective and accurate for time-weighted rates of return (TWROR). The novelty and utility of the method taught in the application is that it can accomplish the same analysis for investments measured by internal rate of return (IRR), which otherwise would be unascertainable.

TWROR is the publicly-traded equity performance measurement standard throughout the world. Using the same notation as the original patent application, TWROR is calculated as follows: $TWROR_i = \dfrac{S_i - S_{i-1}}{S_{i-1}}$ where $i \geq 1$ is the time period at which a cash flow occurs, S_i is the stock's value at that date and S_{i-1} is the stock's value at the immediately preceding cash

flow/valuation date. This can also be expressed as $1 + TWROR_i = \dfrac{S_i}{S_{i-1}}$. Using the latter equation,

once $1 + TWROR_i$ has been calculated for all i through $i = n$, where n is the terminal time period,

the TWROR from period 0 through n is calculated as the nth root of the geometric mean of

TWROR minus 1: $TWROR_S = [(1 + TWROR_0) * (1 + TWROR_1) * ...(1 + TWROR_n)]^{1/n} - 1$

TWROR is therefore not an iterative numerical method with multiple possible solutions,

as IRR is. Rather, it is a closed-form computation with a single, unambiguous result. TWROR

differs from IRR in another, extremely important way: it is scalable. Scalability is a property that

makes it possible to determine the exact contribution of a specific weighting of a combination of

assets to an overall portfolio return. Thus, if a portfolio were to consist of a single stock with a

TWROR of 10% over the period in question and a single bond with a TWROR of 5% over the

same time period; if the terminal value at n of the stock were $100 and the terminal value of the

bond at the same date were $50, for a total portfolio value at the terminal date of $150; if the

total number of individual assets j in the portfolio is expressed as m; and if the weights of the

assets in the portfolio are expressed as w_j; then, the portfolio return would be calculated as

$r_P = \displaystyle\sum_{j=1}^{m} w_j TWROR_j$. In this example, $r_P = (\$100/\$150 * 10\%) + (\$50/\$150 * 5\%) = 8.33\%$. The

TWROR property of scalability therefore makes it possible to calculate the portfolio return

without knowing anything more than the weights of the assets comprising the portfolio and their

respective TWRORs.

IRR, on the other hand, does not possess the property of scalability. In the example

above, if the stock and bond had IRRs of 10% and 5%, respectively, there would be no way to

calculate the IRR of the portfolio without much more information in addition to their respective

weights in the terminal value of the portfolio. Specifically, calculation of portfolio IRR would require exact knowledge of the cash flows from both the stock and the bond, both as to amount and as to timing, which, when combined, could be used to calculate the portfolio IRR statistic.

The lack of scalability of the IRR statistic has led to the conventional wisdom in the finance industry that the IRR is not amenable to arithmetic manipulation at all. An average IRR, for example, is a meaningless statistic (or, more accurately, a profoundly ambiguous statistic with infinitely many combinations of cash flow weights and timing potentially leading to the same IRR result). It is the incommensurability of the IRR statistic that makes the method taught in the patent application so novel and useful. Using the method taught in the patent application, it is possible to calculate IRRs that can be added and subtracted to deconstruct the total IRR into its constituent parts: cash flow weights and cash flow timing, and to use that information to produce the manager's performance indicator.
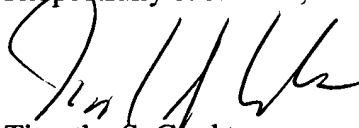
The Feldman patent can thus in no way be said to teach or suggest the claimed invention. Applicants respectfully request withdrawal of this rejection.

Conclusion

In light of the foregoing amendments and remarks, Applicants respectfully submit that all claims are in condition for allowance, and solicit an early indication to that effect. Should the Examiner have any questions regarding this response, she is invited to contact the undersigned representative at 512.542.8446.

Respectfully submitted,

Timothy S. Corder
Registration. No. 38,414
Agent for Applicant

VINSON & ELKINS L.L.P.
First City Tower
1001 Fannin Street
Suite2300
Houston, Texas 77002-6760
Ph: 512.542.8446

Date: October 6, 2005